06-20-00 A

Practitioner's Docket No. 297-009466-US(PAR) **PATENT**

jc841 U.S. PTO 06/19/00

jc833 U.S. PTO 09/595970 06/19/00

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: *"All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P. § 601, 7th ed.*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Guillaume SEBIRE, Nikolai NEFEDOV

WARNING: *37 C.F.R. § 1.41(a)(1) points out:*

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(i) is filed supplying or changing the name or names of the inventor or inventors."

For (title): METHOD AND ARRANGEMENT FOR USING A SELECTED SIGNAL PROCESSING SCHEME TO CARRY INFORMATION

09595970.061900

CERTIFICATION UNDER 37 C.F.R. § 1.10*
(Express Mail label number is mandatory.)
(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date June 19, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL336863615US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Deborah J. Clark

(type or print name of person mailing paper)

Deborah J Clark

Signature of person mailing paper

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

***WARNING:** *Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).*
*"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.*

1. Type of Application

This new application is for a(n)

(check one applicable item below)

☒ Original (nonprovisional)

☐ Design

☐ Plant

WARNING: *Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. § 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.*

WARNING: *Do not use this transmittal for the filing of a provisional application.*

NOTE: *If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.*

☐ Divisional.

☐ Continuation.

☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. §§ 119(e), 120, or 121)

NOTE: *A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. § 112. Each prior application must also be:*

(i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or

(ii) Complete as set forth in § 1.51(b); or

(iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or

(iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(l) within the time period set forth in § 1.53(f).

37 C.F.R. § 1.78(a)(1).

NOTE: *If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

WARNING: *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. §§ 120, 121 or 365(c), the 20–year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. §§ 120, 121 or 365(c). (35 U.S.C. § 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. §§ 119, 365(a) or 365(b).) For a c–i–p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

WARNING: *When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).*

☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

A. Required for filing date under 37 C.F.R. § 1.53(b) (Regular) or 37 C.F.R. § 1.153 (Design) Application

_13_ Pages of specification

_2_ Pages of claims

_8_ Sheets of drawing

WARNING: ***DO NOT*** *submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. § 1.84, see Notice of March 9, 1988 (1990 O.G. 57-62).*

NOTE: ***"Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page . . ." 37 C.F.R. § 1.84(c)).***

(complete the following, if applicable)

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. § 1.84(b).

☐ formal

☐ informal

B. Other Papers Enclosed

_6_ Pages of declaration and power of attorney

_1_ Pages of abstract

____ Other

4. Additional papers enclosed

☐ Amendment to claims

- ☐ Cancel in this applications claims ____________________ before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
- ☐ Add the claims shown on the attached amendment. (Claims added have been numbered consecutively following the highest numbered original claims.)

☐ Preliminary Amendment

☐ Information Disclosure Statement (37 C.F.R. § 1.98)

☐ Form PTO-1449 (PTO/SB/08A and 08B)

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☐ Other

5. **Declaration or oath (including power of attorney)**

NOTE: *A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. §§ 1.63(d)(1)-(3).*

NOTE: *A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name including family name and at least one given name, without abbreviation together with any other given name or initial, and the residence, post office address and country or citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 C.F.R. § 1.63(a)(1)-(4).*

☒ Enclosed

Executed by

(check **all** *applicable boxes)*

☒ inventor(s).

☐ legal representative of inventor(s).
37 C.F.R. §§ 1.42 or 1.43.

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ This is the petition required by 37 C.F.R. § 1.47 and the statement required by 37 C.F.R. § 1.47 is also attached. *See* item 13 below for fee.

☐ Not Enclosed.

NOTE: *Where the filing is a completion in the U.S. of an International Application or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.*

☐ Application is made by a person authorized under 37 C.F.R. § 1.41(c) on behalf of *all* the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 C.F.R. § 1.16(e) can be filed subsequently).

☐ Showing that the filing is authorized.
(not required unless called into question. 37 C.F.R. § 1.41(d))

6. Inventorship Statement

WARNING: *If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.*

The inventorship for all the claims in this application are:

☐ The same.

or

☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

  ☐ is submitted.

  ☐ will be submitted.

7. Language

NOTE: *An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of $130.00 required by 37 C.F.R. § 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 C.F.R. § 1.52(d).*

☒ English

☐ Non-English

  ☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. § 1.52(d).

8. Assignment

☒ An assignment of the invention to Nokia Mobile Phones Ltd.

  ☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

  ☐ will follow.

NOTE: *"If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).*

WARNING: *A newly executed "CERTIFICATE UNDER 37 C.F.R. § 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.*

9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Finland	991414	21 June 1999
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☒ is (are) attached.

☐ will follow.

NOTE: *The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 C.F.R. § 1.55(a) and 1.63.*

NOTE: *This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. § 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

10. Fee Calculation (37 C.F.R. § 1.16)

A. ☒ Regular application

CLAIMS AS FILED

	Number filed		Number Extra		Rate	Basic Fee 37 C.F.R. § 1.16(a) $ 690.00
Total Claims (37 C.F.R. § 1.16(c))	4	− 20 =	0	×	$ 18.00	0
Independent Claims (37 C.F.R. § 1.16(b))	4	− 3 =	1	×	$ 78.00	78.00
Multiple dependent claim(s), if any (37 C.F.R. § 1.16(d))				+	$260.00	

☐ Amendment cancelling extra claims is enclosed.

☐ Amendment deleting multiple-dependencies is enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: *If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 C.F.R. § 1.16(d).*

Filing Fee Calculation $ 768.00

B. ☐ Design application
($310.00—37 C.F.R. § 1.16(f))

Filing Fee Calculation $

C. ☐ Plant application
($480.00—37 C.F.R. § 1.16(g))

Filing fee calculation $

11. Small Entity Statement(s)

☐ Statement(s) that this is a filing by a small entity under 37 C.F.R. § 1.9 and 1.27 is (are) attached.

WARNING: *"Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. § 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 C.F.R. § 1.28(a)(2).*

WARNING: *"Small entity status must not be established when the person or persons signing the . . . statement can* ***unequivocally*** *make the required self-certification." M.P.E.P., § 509.03, 6th ed., rev. 2, July 1996 (emphasis added).*

(complete the following, if applicable)

☐ Status as a small entity was claimed in prior application
_______ / ________________, filed on ________________, from which benefit is being claimed for this application under:

35 U.S.C. § ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of **A**, **B** or **C** above)

$________________________

NOTE: Any excess of the full fee paid will be refunded if small entitiy status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 C.F.R. § 1.28(a).

12. Request for International-Type Search (37 C.F.R. § 1.104(d))

(complete, if applicable)

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

- ☐ No filing fee is to be paid at this time. *(This and the surcharge required by 37 C.F.R. § 1.16(e) can be paid subsequently.)*

☒ Enclosed

☒ Filing fee	$ 768.00
☒ Recording assignment ($40.00; 37 C.F.R. § 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".)	$ 40.00
☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached ($130.00; 37 C.F.R. §§ 1.47 and 1.17(i))	$
☐ For processing an application with a specification in a non-English language ($130.00; 37 C.F.R. §§ 1.52(d) and 1.17(k))	$
☐ Processing and retention fee ($130.00; 37 C.F.R. §§ 1.53(d) and 1.21(l))	$
☐ Fee for international-type search report ($40.00; 37 C.F.R. § 1.21(e))	$

NOTE: *37 C.F.R. § 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 C.F.R. § 1.53(f) and this, as well as the changes to 37 C.F.R. §§ 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(f).*

Total fees enclosed $ 808.00

14. Method of Payment of Fees

☒ Check in the amount of $ 808.00

☐ Charge Account No. ____________ in the amount of $__________

A duplicate of this transmittal is attached.

NOTE: *Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).*

15. Authorization to Charge Additional Fees

WARNING: *If no fees are to be paid on filing, the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 16-1350:

- ☒ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)
- ☒ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

- ☒ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)
- ☒ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).
- ☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: ". . .A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

- ☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . the issue fee. . . " From the wording of 37 C.F.R. § 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

NOTE: ". . . Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ Credit Account No. 16-1350

☐ Refund

SEND ALL CORRESPONDENCE TO:

SIGNATURE OF PRACTITIONER

Reg. No. 24,622

Clarence A. Green

(type or print name of attorney)

Tel. No. (203) 259-1800

PERMAN & GREEN, LLP

P.O. Address

Customer No.

425 Post Road, Fairfield, Connecticut 06430

☐ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added ______

☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added ______

☐ Plus added pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added ______

☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added ______

☒ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

☒ This transmittal ends with this page.

EXPRESS MAIL #
EL336863615US

TITLE: Method and arrangement for using a selected signal processing scheme to carry information

TECHNOLOGICAL FIELD

The invention concerns generally the technological field of conveying digital information over a wireless interface from a transmitting device to a receiving device. Especially the invention concerns the use of a certain selected signal processing scheme to carry meaningful information.

BACKGROUND OF THE INVENTION

In standardized digital wireless systems like digital cellular radio networks there is a standardized form for each message that a transmitting device is allowed to transmit over the wireless interface to the receiving device. Due to the limited number of available transmission frequencies and the requirements for minimized delays each message should be as compact as possible. This has resulted in difficulties when extensions and additions to the existing standards are made afterwards.

In digital wireless systems the contents of all messages are basically sequences of bits with a limited sequence length. The specifications usually reserve some otherwise unspecified bit combinations for future additions and extensions, but it may happen that in the future so many additions and extensions are made that these simply run out. In such a situation it is usually required that a completely new kind of a message is specified, which has serious implications in the form of required upgrading of system hardware and software.

As an example we will examine the known packet access burst format which is defined in the specifications of the GSM system (Global System for Mobile telecommunications) for the use of mobile stations when they want to request resources for a dedicated packet data channel. The definition of a packet access burst covers 157 consecutive bits according to Table I.

Table I

Bit no.	Field length	Field contents	Definition
0-7	8	extended tail bits	0, 0, 1, 1, 1, 0, 1, 0
8-48	41	synchronization sequence	0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 0,
49-84	36	encrypted bits	11 information bits, 6 parity bits and a base station identifier; all coded together
85-87	3	tail bits	0, 0, 0
88-156	68.25	extended guard period	period of no transmission at all

The actual information content of the packet access request must be represented by the 11 information bits mentioned on the middle row of Table I. It is clear that the amount of information that can be represented with only 11 bits is quite limited. Table II shows the definitions which are currently given to the contents of the field of 11 information bits.

Table II

Bits											Packet Channel Access
11	10	9	8	7	6	5	4	3	2	1	
0	m	m	m	m	m	p	p	r	r	r	One Phase Access Request (OPAR)
1	0	0	n	n	n	p	p	r	r	r	Short Access Request (SAR)
1	1	0	0	0	0	p	p	r	r	r	Two Phase Access Request (TPAR)
1	1	0	0	0	1	p	p	r	r	r	Page Response
1	1	0	0	1	0	p	p	r	r	r	Cell Update
1	1	0	0	1	1	p	p	r	r	r	Mobility Management Procedure
1	1	0	1	0	0	r	r	r	r	r	Single Block w/o TBF establishment
All others											Reserved

In the table a letter m represents a bit that is a part of a MS multislot class indicator (there are 29 classes, so 5 bits are required), a letter p represents a bit that is a part of a radio priority indicator (4 priorities, 2 bits), a letter n represents a bit that is a part of an indicator revealing the number of RLC (Radio Link Control) data blocks requested during a mobile-originated TBF (Temporary Block Flow) (max. 8 blocks, 3 bits) and a letter r represents a bit that is a part of a random reference in an otherwise unformatted field.

As a specific example, despite of the relatively large number of "Reserved" bit combinations there appears to be no suitable and unspecified bit combinations that a mobile station could use to separately indicate its capability of using either the basic GPRS (General Packet Radio System), the EGPRS (Extended GPRS) with eight-level phase shift keying (8PSK) as the modulation method or the EGPRS without 8PSK as the modulation method, when the mobile station is making a One Phase Access Request (OPAR), a Short Access Request (SAR) or a Two Phase Access Request (TPAR). The possibility of even further similar needs is also foreseeable.

A proposal has been made to abandon the rule of having only one allowed form for the synchronization sequence (also known as the training sequence) and to use the selected form of the synchronization/training sequence as an indicator of a certain piece of information. However, this known solution has the drawback that it requires some complicated and potentially expensive changes to be made in some older devices existing in the networks that are to be used to provide the packet data services. Another proposal is to modulate the message to be transmitted with one of a set of alternative modulation methods so that the selection of the modulation method would indicate the modulation and demodulation capabilities of the device transmitting the message. This method is only applicable when there are several modulation methods to choose from, and it rules out the advantageous proposal of using always the simplest and robustest modulation method to modulate important messages like access requests.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method for increasing the information transmission capacity of a message in a digital wireless system without the drawbacks of prior art solutions. It is also an object of the present invention to provide the hardware that is required to implement the method.

The objects of the invention are accomplished by defining a set of allowed signal processing methods that are used to prepare the contents of the message in the baseband domain before finally assembling it for transmission, and using a certain selection for the signal processing method to convey a certain piece of information.

The method according to the invention is characterized in that it comprises the steps of
- providing a second piece of information to be transmitted and
- selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information.

The invention also applies to a transmitting device which comprises the characteristic features of
- means for providing a second piece of information to be transmitted and
- means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information.

The invention applies further to a receiving device which comprises the characteristic features of
- means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods so that applying it produces a first piece of received information which satisfies a certain criterion of acceptance and
- means for providing a second piece of received information in the form of the identified baseband signal processing method.

Additionally the invention applies to a digital wireless system which comprises the characteristic features of
- in the transmitting device means for providing a second piece of information to be transmitted and means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information, and
- in the receiving device means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods so that applying it produces a first piece of received information which satisfies a certain criterion of acceptance and means for providing a second piece of received information in the form of the identified baseband signal processing method.

In the research work resulting in the invention it was noticed that several coding schemes that are used to compose the encoded contents of an information field in a message have features resembling orthogonality, i.e. it is only possible to decode a certain encoded bit sequence with the correctly selected decoding method while the

decoding methods associated with the other coding schemes do not give any meaningful results. Consequently it was found out that the selection of coding scheme, or in wider sense the selection of a baseband signal processing method, can be used to convey a piece of information.

When a set of allowed baseband signal processing methods with their associated reverse processing methods have been defined, we may define an unequivocal correspondence between each individual baseband signal processing (and reverse processing) method and the corresponding piece of information which is most advantageously taken from a set of mutually exclusive pieces of information: if only one baseband signal processing method is selected at a time, only one piece of information may be conveyed by the selection. The transmitting device makes its selection according to which piece of information it wants to transmit. The receiving device does not generally know the selection beforehand, so typically it has to experiment with the different reverse processing methods to find the one which gives meaningul results.

As the baseband signal processing methods referred to above we may take for example different scrambling patterns, so that only the correct descrambling pattern restores the scrambled message in its original form, or different convolutional encoding schemes, so that the correct decoding scheme has to be found. It is advantageous to calculate a certain checksum from the information bits of the message before the selected baseband signal processing method is applied so that recalculating the checksum at the receiving end reveals the correct reverse processing method: the receiving device tries different reverse processing methods and the one that facilitates the calculation of a matching checksum is most probably the correct one. Only if a very specific error has occurred during transmission may it happen that actually an incorrect reverse processing method gives the message in a form where the checksum seems to match.

A further possible allowed set of mutually exclusive baseband signal processing methods may be formed around the process of calculating a checksum: the formula used to calculate the checksum is selected from a set of mutually (nearly) orthogonal formulas according to the piece of ”additional” information which is to be transmitted, and the receiving device tries the calculation formulas one at a time until it finds the one which gives a matching checksum.

BRIEF DESCRIPTION OF DRAWINGS

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

Fig. 1a	illustrates a known encoding principle,
Fig. 1b	illustrates a known decoding principle,
Fig. 2a	summarizes the known functions of Figs. 1a and 1b,
Fig. 2b	illustrates an advantageous coding and decoding principle according to the invention,
Fig. 3a	illustrates an encoding principle according to a first embodiment of the invention,
Fig. 3b	illustrates a decoding principle according to the first embodiment of the invention,
Fig. 4a	illustrates an encoding principle according to a second embodiment of the invention,
Fig. 4b	illustrates a decoding principle according to the second embodiment of the invention,
Fig. 5a	illustrates an encoding principle according to a third embodiment of the invention,
Fig. 5b	illustrates a decoding principle according to the third embodiment of the invention,
Fig. 6a	illustrates an encoding principle according to a fourth embodiment of the invention,

Fig. 6b illustrates a decoding principle according to the fourth embodiment of the invention,

Similar parts in the drawing are referred to by the same reference designators.

DETAILED DESCRIPTION OF THE INVENTION

Fig. 1a is a schematic block diagram that illustrates the known encoding scheme that is used to compose a packet access request message in accordance with the known GSM and GPRS specifications. To start with there is at the left of Fig. 1a a first tail bit generator 101 to generate the constant bit patterns shown as extended tail bits and tail bits in Table I, a training sequence generator 102 to generate the synchronization sequence shown in Table I, an information bit generator 103 to generate the 11 information bits the use of which is shown in Table II, a BTS ID provider block 104 to provide the identifier of the base station to which the access request will be directed, and a second tail bit generator 105 to provide certain constant bits used in the encoding. The output of the information bit generator 103 is coupled to a parity bit calculator 106 which takes the eleven information bits $d(0)$, $d(1), \ldots, d(10)$ and determines six parity bits $p(0), p(1), \ldots, p(5)$ so that the binary polynomial $d(0)D^{16}+\ldots+d(10)D^{6}+p(0)D^{5}+\ldots+p(5)$ when divided by $D^6+D^5+D^3+D^2+D+1$ yields a remainder equal to $D^5+D^4+D^3+D^2+D+1$, where the D's are certain multipliers defined in the system specifications. The parity bits $p(0), p(1), \ldots, p(5)$ are led to a modulo 2 adder block 107.

The BTS ID provider block 104 provides six identifier bits $B(0), B(1), \ldots, B(5)$ to the modulo 2 adder block 107 which then performs a bitwise modulo 2 addition resulting in six colour bits $C(0), C(1), \ldots, C(5)$ so that $C(\mathrm{k}) = B(\mathrm{k}) + p(\mathrm{k})$ for each $\mathrm{k} = 0$ to 5. The outputs of the information bit generator 103, the modulo 2 adder block 107 and the second tail bit generator 105 are coupled to the convolutional encoder 108 so that the twenty-one input bits $u(0), u(1), \ldots, u(20)$ thereof may be defined as follows: $u(\mathrm{k}) = d(\mathrm{k})$ for $\mathrm{k} = 0$ to 10, $u(\mathrm{k}) = C(\mathrm{k}-11)$ for $\mathrm{k} = 11$ to 16 and $u(\mathrm{k}) = 0$ for $\mathrm{k} = 17$ to 20. From these twenty-one input bits $u(0), u(1), \ldots, u(20)$ the convolutional encoder 108 produces forty-two convolutionally encoded output bits $c(0), c(1), \ldots, c(41)$ by applying a convolutional code defined by the polynomials $G0 = 1 + D^3 + D^4$ and $G1 = 1 + D + D^3 + D^4$, i.e. $c(2\mathrm{k}) = u(\mathrm{k}) + u(\mathrm{k}-3) + u(\mathrm{k}-4)$ and

$c(2k+1) = u(k) + u(k-1) + u(k-3) + u(k-4)$ for $k = 0$ to 20 and $u(k) = 0$ for $k < 0$. These encoded bits are fed into the puncturing block 109 which removes the encoded bits $c(0)$, $c(2)$, $c(5)$, $c(37)$, $c(39)$ and $c(41)$ to produce the thirty-six encrypted bits mentioned in Table I. The outputs of the blocks 101, 102 and 109 are coupled to a burst formatter 110 which composes the actual transmission burst by putting the corresponding bits into the order shown in Table I.

Fig. 1b is a schematic block diagram illustrating a known decoder used to decode transmissions where the packet access requests haven been composed by an encoding arrangement shown in Fig. 1a. A burst decomposer block 151 reverses the function of the burst formatter 110. The training sequence is used in the synchronization analyzer block 152 to provide timing feedback into the burst decomposition and previous receiving operations (not shown). A depuncturing block 153 is used to fill the punctured gaps in the sequence of coded bits by indefinite information, resulting in a restored sequence of forty-two encoded bits. A viterbi decoder 154 decodes the convolutional code and provides a sequence of twenty-one bits that should be the same as the bits $u(0), u(1), \ldots, u(20)$ referred to above, if no transmission errors have occurred. The reception takes place at a base station where the base station identifier is known, so from the $C(k)$ bits that form a part of the $u(k)$ bits the checksum verifier block 155 is able to deduce the original parity bits by a new bitwise addition. The checksum verifier block 155 recalculates the parity bits, also known as the checksum, from the original information bits and compares them to the parity bits received within the message. If there is a match the checksum verifier block 155 outputs the information bits, and if there is no match the checksum verifier block 155 gives an error indication causing the received packet access request to be neglected by the base station as erroneous.

Fig. 2a summarizes the known functions of Fig. 1a and 1b on a more abstract level. A certain piece of information is encoded in block 201 and transmitted by block 202 in encoded form. In the receiving end the encoded piece of information is received by block 203 and decoded by block 204. In the absence of transmission errors the same piece of information is thus restored.

Fig. 2b shows how a second piece of information may be conveyed by selecting the coding scheme in a certain way. The first piece of information is actually conveyed through the encoder 251, the transmitter 252, the receiver 253 and the decoder 254 substantially similarly as in Fig. 2a. However, there are more encoding schemes available than just one, and the second piece of information defines the selection

through block 255. Similarly in the receiving end there is a block 256 the task of which is to find out which coding scheme has been applied and to instruct the decoder block 254 to use the correct decoding method. The identification of the correct coding scheme simultaneously reveals the second piece of information.

The combination of two different pieces of information may naturally be used for conveying arbitrary messages, but the invention is particularly useful in situations where the first piece of information stays the same and the second piece of information is some additional information that should also be conveyed to the receiving device. A typical example is the signalling of the capabilities of the mobile station to the base station in association with a packet access request. The basic information stays the same: the mobile station wants to send a One Phase Access Request (OPAR), a Short Access Request (SAR) or a Two Phase Access Request (TPAR). However, simultaneously it wants to inform the base station about its eventual EGPRS capability with or without the 8PSK modulation method.

We may define the alternative coding schemes (or more generally the baseband signal processing schemes) that are used to signal the mobile station's capabilities so that the known coding scheme explained above in association with Figs. 1a and 1b is one of them, and especially the known coding scheme is the one that indicates that the mobile station only has the basic capabilities known from prior art. This definition has the advantage that even all devices that have not been made to operate according to the present invention will continue to function properly despite of the introduction of the invention.

Fig. 3a is a more detailed block diagram of an encoder according to a certain first embodiment of the invention. The blocks of the encoder which are known from Fig. 1a are complemented by a capabilities indicator generator block 301 which determines the capability indication which should be transmitted to a base station as a part of a packet access request. Taken that there are three alternative capabilities (basic GPRS, EGPRS with 8PSK, EGPRS without 8PSK) to be signalled to the base station, the output of block 301 need not be anything else than a two-bit indicator the defined values of which correspond to the mentioned alternative capabilities. Additionally there is a scrambler block 302 located at the output of the information bit generator 103. The scrambler 302 is programmed to respond to the allowed two-bit indicator values it receives from block 301 by selecting and implementing a distinctive scrambling function that unequivocally corresponds to the current indicator value. A scrambling function means that the bits are re-arranged to another

order. One of the scrambling functions is most advantageously a "null scrambling" function meaning that no scrambling at all is made; this is most advantageously the one that corresponds to the signalling of "basic GPRS".

The capabilities indicator generator block 301 may give always the same indicator value that describes the full capability of the mobile station, or it may be programmable so that for example a user selection may cause the mobile station to act as if it did not have all the capabilities it actually has. For example if the pricing policy applied by the network operator favours basic GPRS mobile stations it may be advantageous to make a mobile station act like one.

The alternative scrambling functions implemented by the scrambling block should be "orthogonal" in the sense that if a set of parity bits is calculated for a set of information bits scrambled by a certain first scrambling function it is not possible that the same parity bits are obtained for a certain other set of information bits scrambled by another scrambling function. Suitable scrambling functions may be found through experimenting.

Fig. 3b is a schematic block diagram illustrating a decoder which should be used to decode transmissions where the packet access requests haven been composed by an encoding arrangement shown in Fig. 3a. The most important difference to the known arrangement is that the checksum verifier block 303 houses an incorporated descrambler 304. The task of the descrambler 304 is to reverse the effect of the scrambling function used in the transmitting end. Advantageously the combined checksum verifier and descrambler block 303/304 operates so that from each received and viterbi decoded packet access request the eleven scrambled information bits are restored and the steps of descrambling them and calculating the parity bits for the result is repeated for all three possible descrambling functions. If exactly one of the descrambling functions gives an information bit sequence for which the parity bit calculation gives a match, the checksum verifier and descrambler block 303/304 gives at one output the identifier of the identified descrambling method, which is then the same as the descriptor for the mobile station's capabilities. This information is led to a functional block at the base station and/or at a base station controller that stores the capability information describing the mobile stations (not shown). If none of the descrambling methods results in a parity match, or if two or more descrambling methods result in a parity match the error indication output (and/or the identified descrambling method output) is used to indicate an error, whereby the packet access request should be denied.

It is possible to have the decoder to try the different descrambling functions only until it finds a match, but this makes it impossible to detect an error which causes at least two descrambling functions to erroneously give positive results.

Fig. 4a shows an alternative embodiment where the capabilities indicator generator block 301 operates as described above but its output is led to scrambler 401 which scrambles the parity encoded bits *u*(k), k = 0 to 16 instead of the information bits *d*(k), k = 0 to 10 as in Fig. 3a. In other words the scrambler 401 is coupled to the outputs of the information bit generator 103 and the modulo 2 adder block 107. Otherwise the same considerations as above apply to its operation. Similarly in Fig. 4b the checksum verifier 403 now houses an incorporated descrambler 404 that is arranged to perform the descrambling function before the decomposition of the combined BTS ID, parity and information bits into these parts. Otherwise the same condirations apply also to the receiver part that were given above in association with Fig. 3b.

Fig. 5a shows yet an alternative embodiment where the capabilities indicator generator block 301 again operates as described above but its output is led to scrambler 501 which scrambles the output of the convolutional encoder 108, i.e. the coded bits *c*(k), k = 0 to 41, instead of the parity encoded bits *u*(k), k = 0 to 16 as in Fig. 4a or the information bits *d*(k), k = 0 to 10 as in Fig. 3a. Otherwise the same considerations as above apply to its operation. Fig. 5b shows the decoding arrangement where the checksum verifier 155 may now be similar to those in prior art decoders, because the descrambling function is implemented in a separate descrambling block 502 between the output of the depuncturing block 153 and the input of the viterbi decoder 154. Because the descrambling function is now separated from the checksum verifier, the operation of the whole decoder chain must be coordinated so that after depuncturing a separate decoding run from the descrambling step to the checksum verification step is made for each alternative descrambling function. Otherwise the operation is as explained above: one correctly decoding descrambling function is taken as an indication of successfully identified capabilities indicator from the mobile station, and fewer or more correctly decoding descrambling functions are interpreted as errors. The identification of the correct descrambling method is got by comparing the indicator outputs of blocks 502 and 155.

Fig. 6a shows yet an alternative embodiment where the capabilities indicator generator block 301 again operates as described above but its output is led to scrambler 601 which scrambles the output of the puncturing block 109, i.e. the coded and punctured bits *c*(k), k = 1 to 40 but not 2, 5, 37 or 39, instead of the coded bits *c*(k), k = 0 to 41 as in Fig. 5a, the parity encoded bits *u*(k), k = 0 to 16 as in Fig. 4a or the information bits *d*(k), k = 0 to 10 as in Fig. 3a. Otherwise the same considerations as above apply to its operation. Fig. 6b shows the decoding arrangement where the checksum verifier 155 may again be similar to those in prior art decoders, because the descrambling function is implemented in a separate descrambling block 602 between the output of the burst decomposer block 151 and the input of the depuncturing block 153. The descrambling function is again separated from the checksum verifier, so the operation of the whole decoder chain must be coordinated so that a completely separate decoding run from the descrambling step through depuncturing, viterbi decoding and checksum verification is made for each alternative descrambling function. Otherwise the operation is as explained above: one correctly decoding descrambling function is taken as an indication of successfully identified capabilities indicator from the mobile station, and fewer or more correctly decoding descrambling functions are interpreted as errors. The identification of the correct descrambling method is got by comparing the indicator outputs of blocks 602 and 155.

The embodiments given above may be varied for example so that to indicate basic GPRS capabilities no scrambling is made at all, to indicate EGPRS capabilities with 8PSK a certain first scrambling function is applied at a certain first location in the encoding chain, and to indicate EGPRS capabilities without 8PSK a certain second scrambling function is applied at a certain second location in the encoding chain. Allowing several kinds of alternative scrambling functions to take place at several alternative locations in the encoding chain also increases the number of individual and distinctive pieces of information that can be conveyed by using solely the application of scrambling as an identifier, but simultaneously it makes the required decoder structure more complicated and the required decoder processing speed faster since a large number of decoding runs must be made to make sure that exactly one descrambling method gives the correct result.

Fig. 7a shows yet another embodiment of the invention in the form of a schematic block diagram of an encoder. Other parts of the encoder are as in Fig. 3a, but there is no scrambler at all. Instead there is a convolutional encoder 701 which is capable of alternatively applying one of at least three different and substantially orthogonal

convolutional codes depending on the input it receives from the capabilities indicator generator block 301. One of the convolutional codes is the one known from prior art and given above, and other suitably orthogonal convolutional codes are easily obtained by applying the known theory of convolutional codes and/or by experimenting. In the decoder of Fig. 7b the viterbi decoder 702 is similarly capable of alternatively applying one of at least three decoding schemes which correspond one-to-one to the substantially orthogonal convolutional codes used at the transmitter. The indication of successful decoding (exactly one decoding scheme is allowed to be successful) goes as is explained above in association with descrambling.

In addition to the scrambling/descrambling and convolutional coding / viterbi decoding alternatives described above it is possible to use different definitions for the blocks that calculate the parity bits in the transmitting end and verify them in the receiving end. Figs. 8a and 8b show block diagrams of such embodiments of the invention; affected blocks are the blocks 801, 802 and 803.

CLAIMS

1. A method for conveying information over a wireless interface in the form of a digitally encoded message, comprising the steps of:
- providing a set of bits as a first piece of information to be transmitted,
- applying a certain baseband signal processing method to process the bits to be transmitted,
- providing a second piece of information to be transmitted and
- selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information.

2. A transmitting device for transmitting information over a wireless interface in the form of a digitally encoded message, comprising:
- means for providing a set of bits as a first piece of information to be transmitted
- means for applying a certain baseband signal processing method to process the bits to be transmitted,
- means for providing a second piece of information to be transmitted and
- means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information.

3. A receiving device for receiving information over a wireless interface in the form of a digitally encoded message, comprising:
- means for receiving a set of bits as the representative of a first piece of received information
- means for applying a certain baseband signal processing method to process the set of bits,
- means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods so that applying it produces a first piece of received information which satisfies a certain criterion of acceptance and
- means for providing a second piece of received information in the form of the identified baseband signal processing method.

4. A transmission system comprising:
- a transmitting device and a receiving device,
- in the transmitting device means for providing a set of bits as a first piece of information to be transmitted and means for applying a certain baseband signal processing method to process the bits to be transmitted,

- further in the transmitting device means for providing a second piece of information to be transmitted and means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information,
- in the receiving device means for receiving a set of bits as the representative of a first piece of received information and means for applying a certain baseband signal processing method to process the set of bits, and
- further in the receiving device means for selecting the baseband signal processing method from a set of allowed baseband signal processing methods so that applying it produces a first piece of received information which satisfies a certain criterion of acceptance and means for providing a second piece of received information in the form of the identified baseband signal processing method.

ABSTRACT

A method is presented for conveying information over a wireless interface in the form of a digitally encoded message, comprising the steps of
- providing a set of bits as a first piece of information to be transmitted and
- applying a certain baseband signal processing method to process the bits to be transmitted.

It additionally comprises the steps of
- providing a second piece of information to be transmitted and
- selecting the baseband signal processing method from a set of allowed baseband signal processing methods in accordance with the provided second piece of information.

Fig. 2b

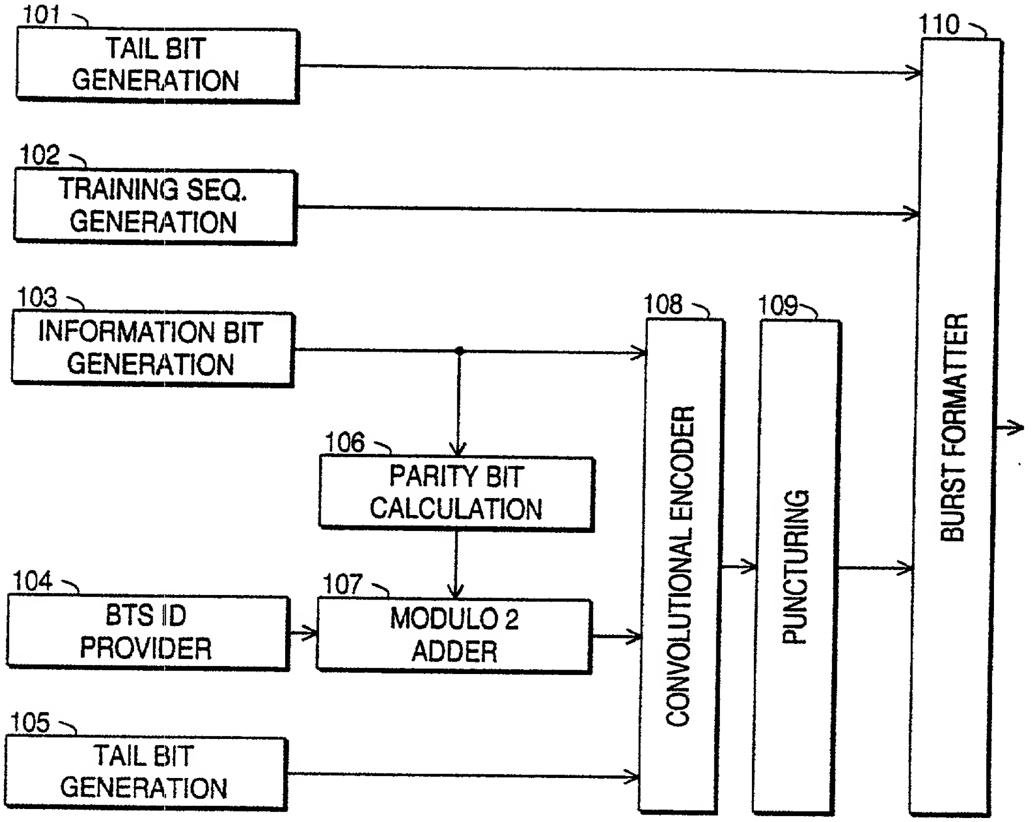


Fig. 1a
PRIOR ART

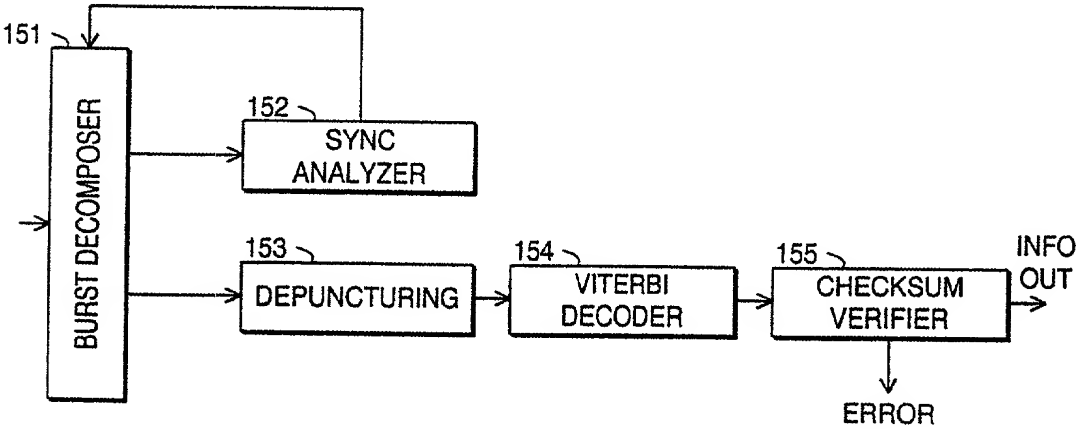


Fig. 1b
PRIOR ART

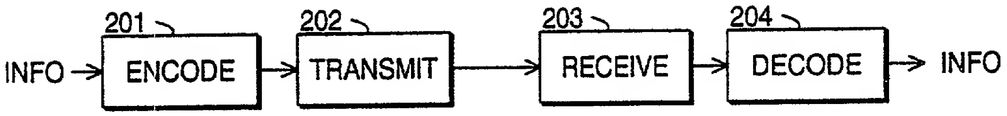


Fig. 2a
PRIOR ART

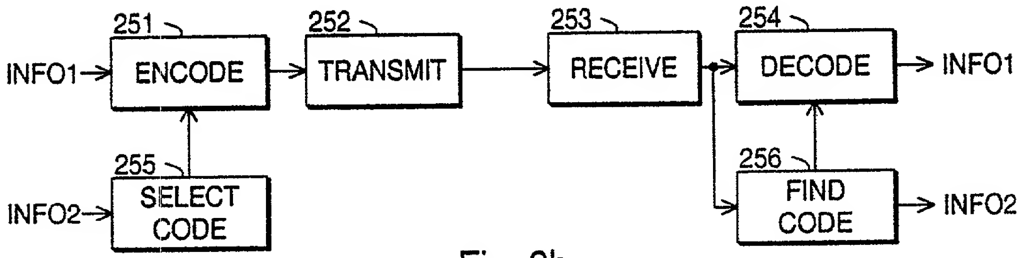
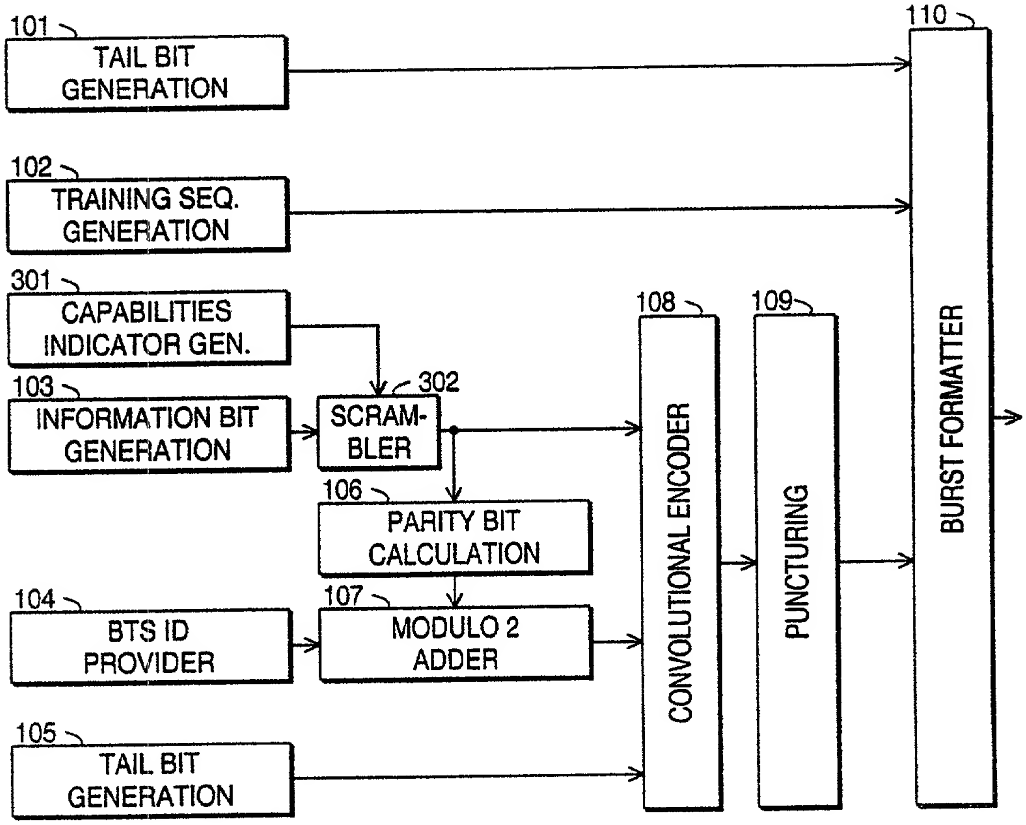


Fig. 2b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SCRAM-BLER
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PARITY BIT CALCULATION
104
BTS ID PROVIDER
107
MODULO 2 ADDER
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TAIL BIT GENERATION
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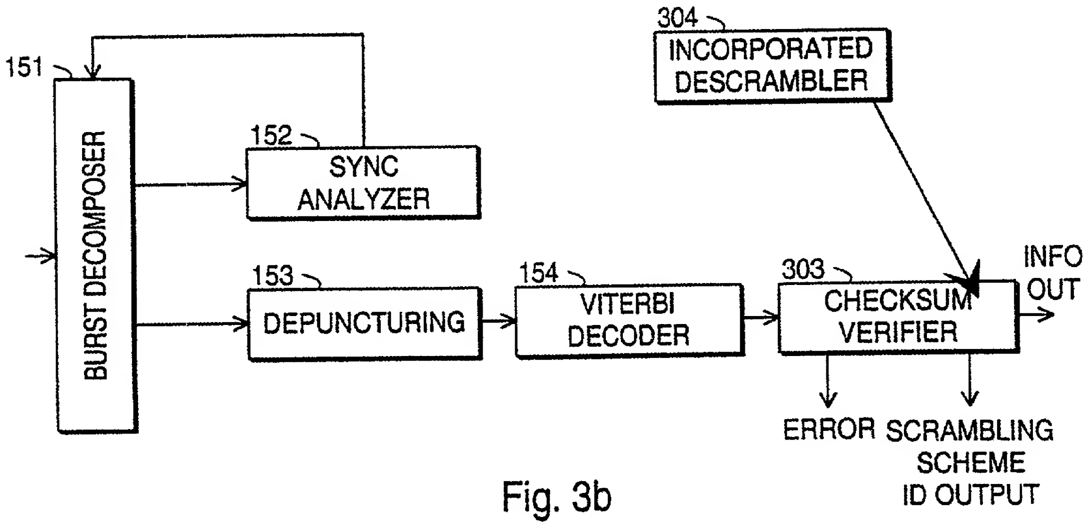
CONVOLUTIONAL ENCODER
109
PUNCTURING
110
BURST FORMATTER

Fig. 3a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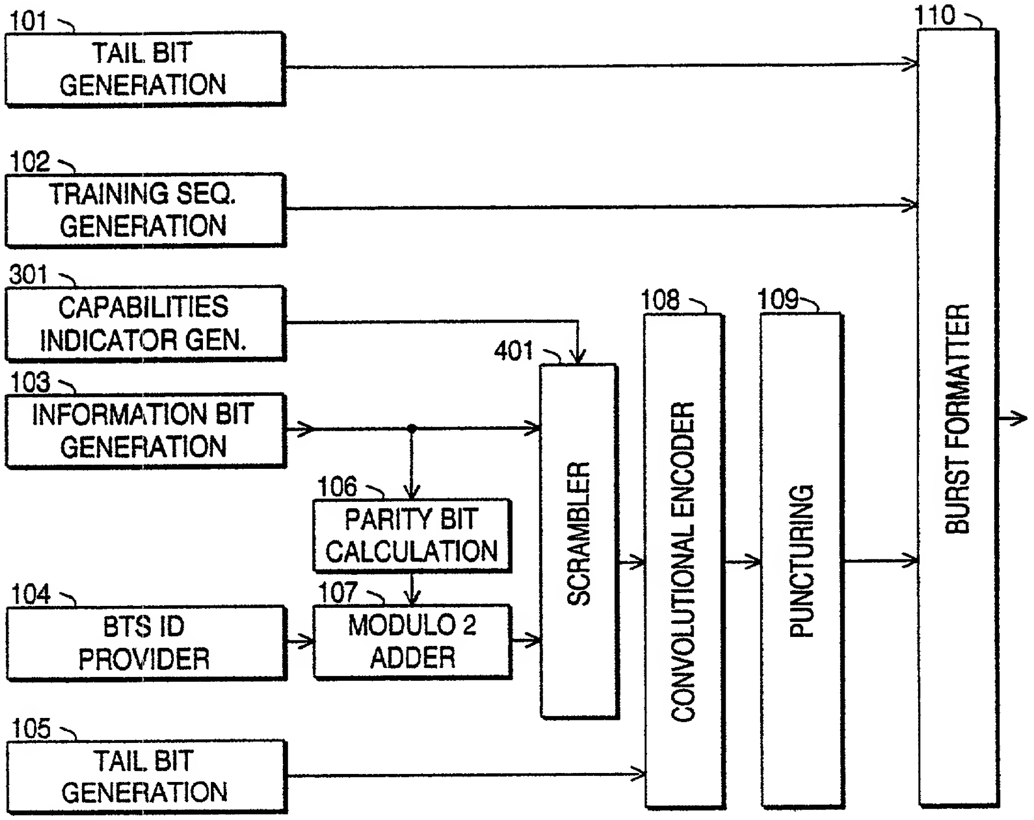
INFO OUT
ERROR
SCRAMBLING SCHEME ID OUTPUT

Fig. 3b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107
MODULO 2 ADDER
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BURST FORMATTER

Fig. 4a

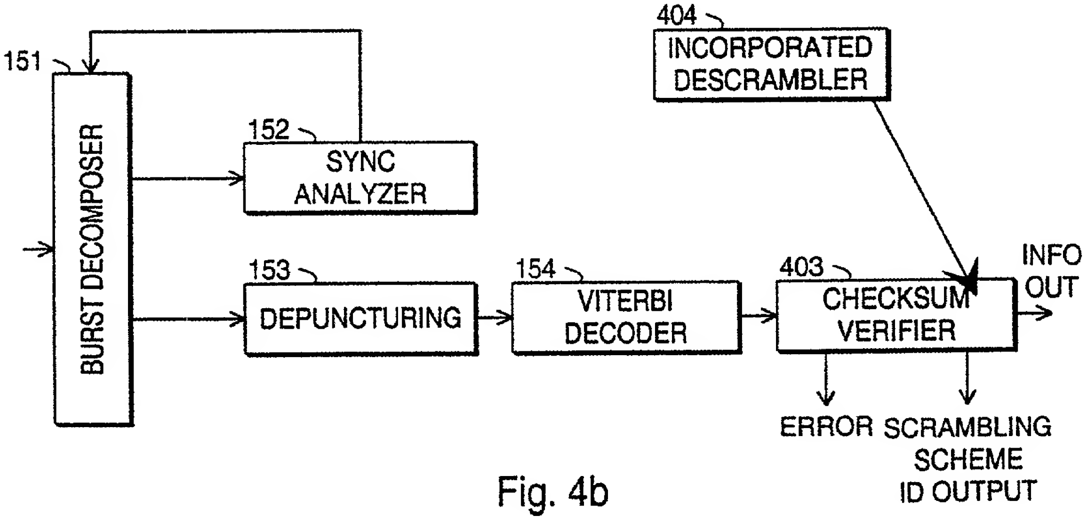
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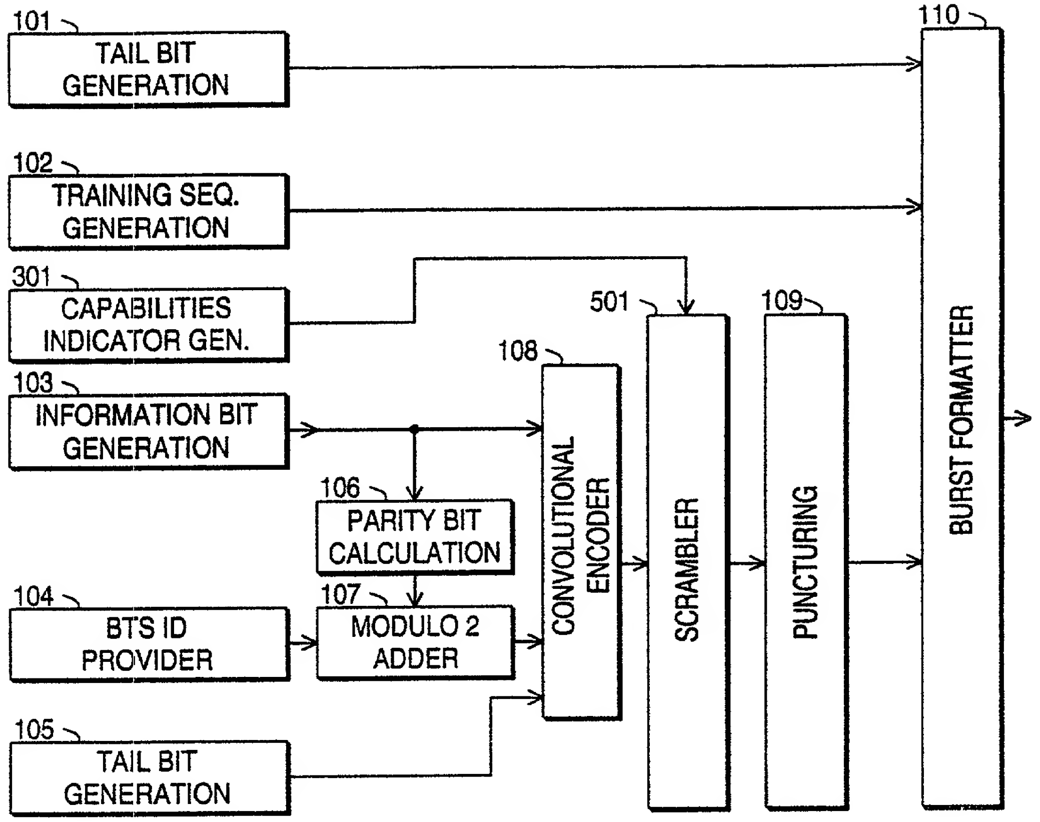
Fig. 4b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BURST FORMATTER

Fig. 5a

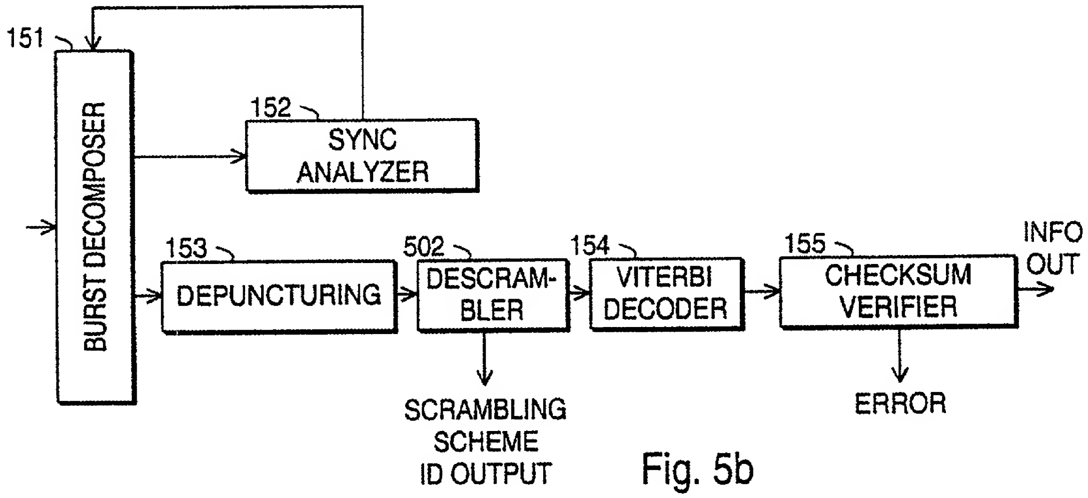
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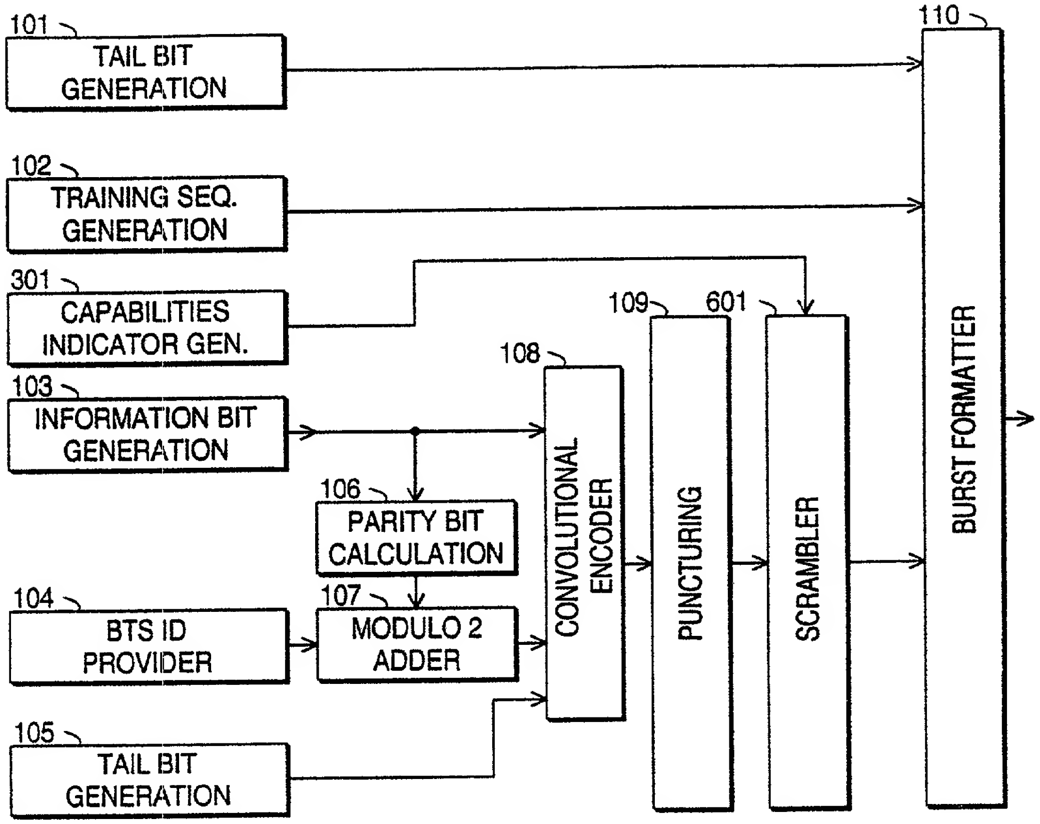
Fig. 5b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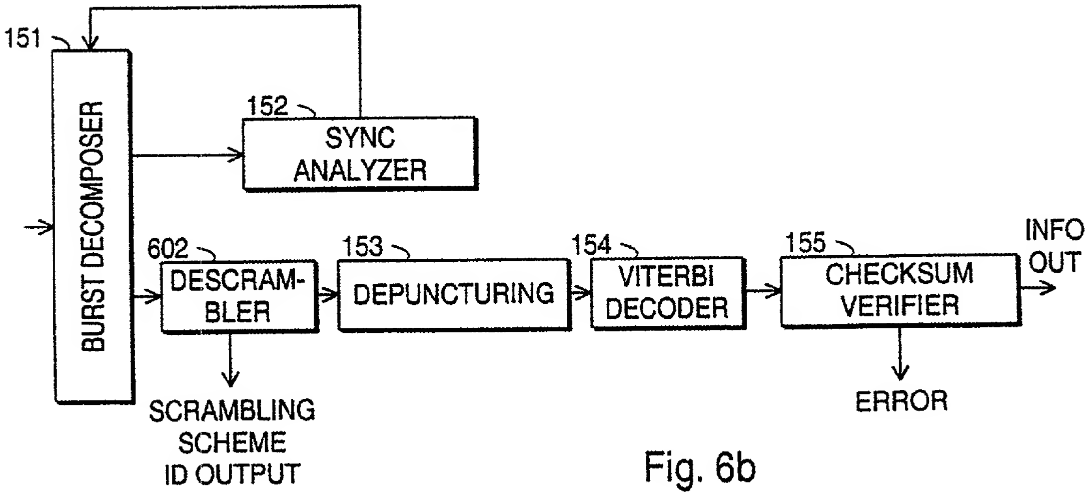
BURST FORMATTER

Fig. 6a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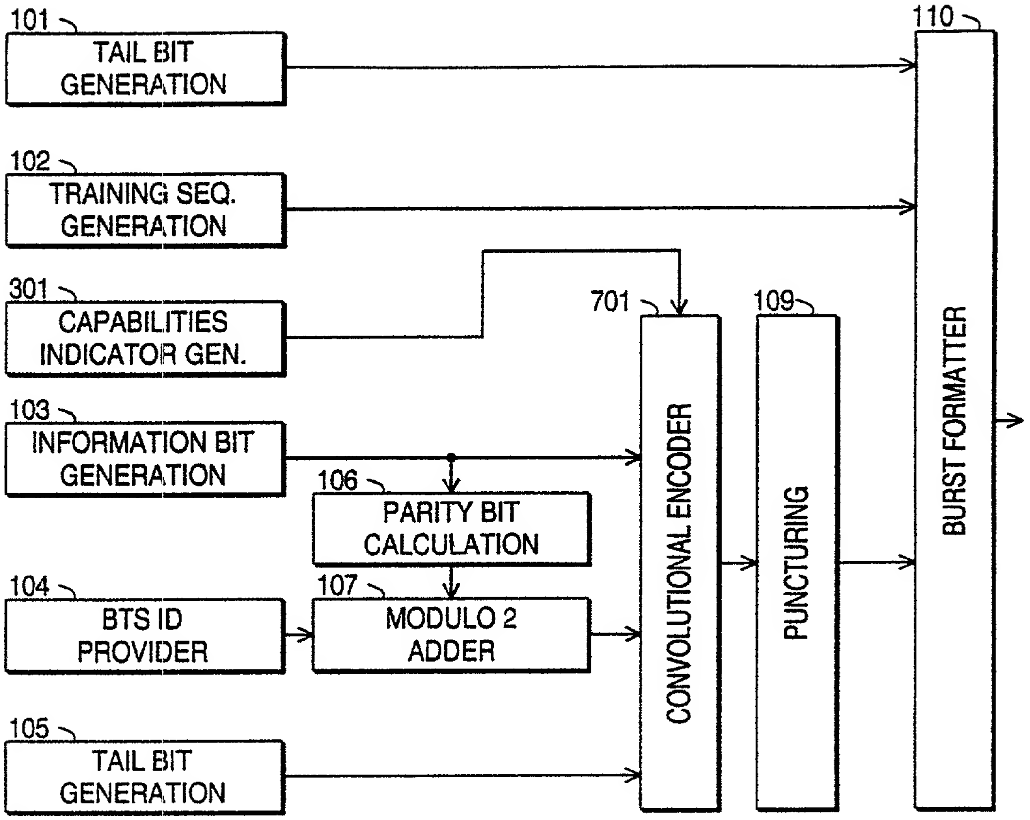
CHECKSUM VERIFIER
INFO OUT
ERROR

Fig. 6b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MODULO 2 ADDER
105
TAIL BIT GENERATION
701
CONVOLUTIONAL ENCODER
109
PUNCTURING
110
BURST FORMATTER

Fig. 7a

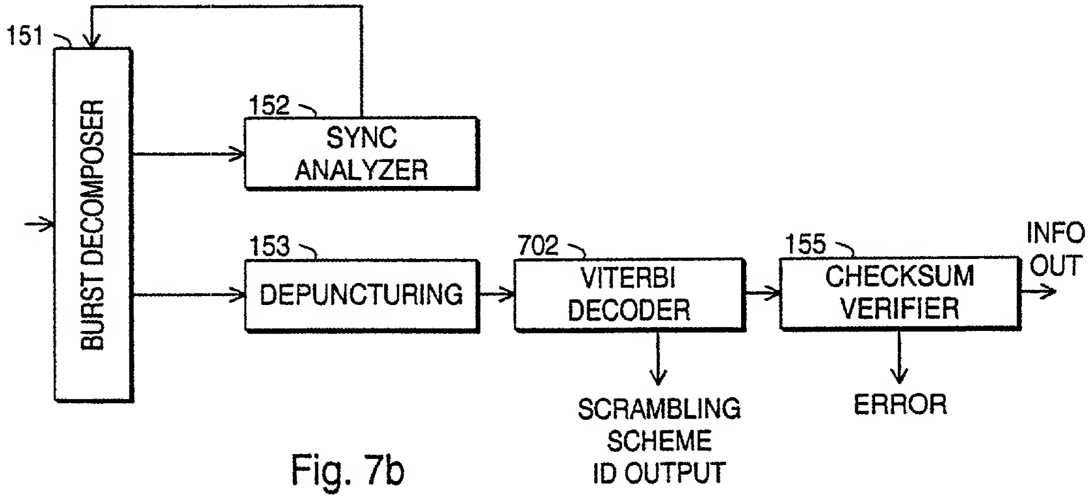
151
BURST DECOMPOSER
152
SYNC ANALYZER
153
DEPUNCTURING
702
VITERBI DECODER
155
CHECKSUM VERIFIER
INFO OUT
SCRAMBLING SCHEME ID OUTPUT
ERROR

Fig. 7b

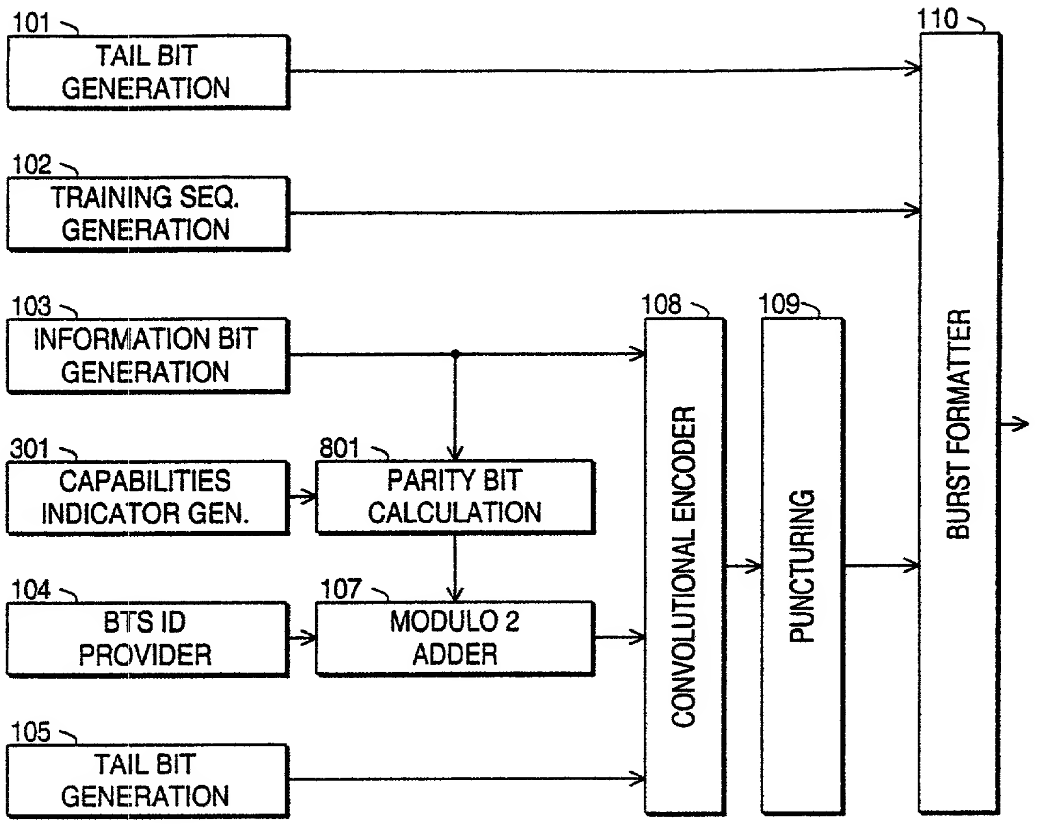

Fig. 8a

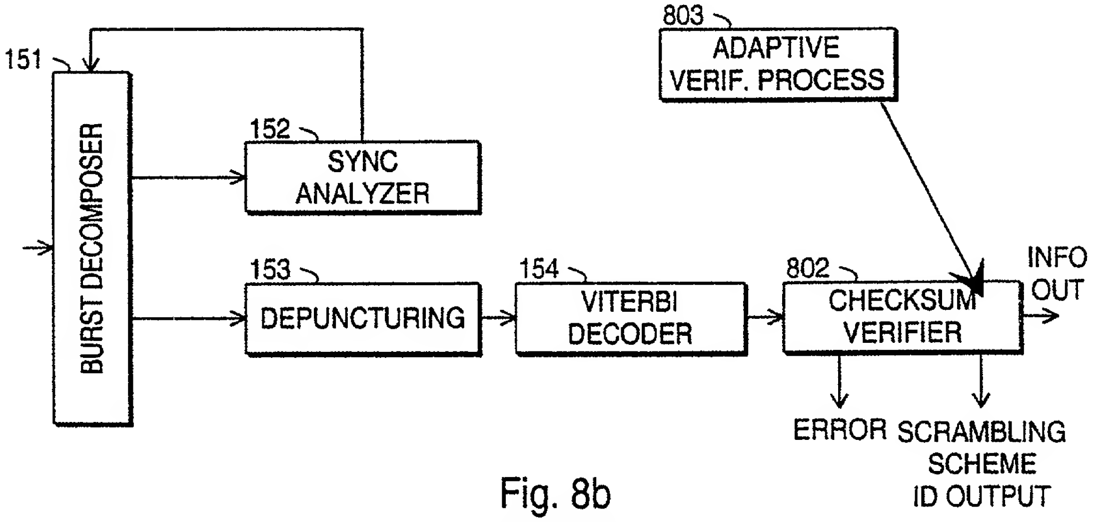

Fig. 8b
PRIOR ART

Attorney's Docket No. ____________________ **PATENT**

COMBINED DECLARATION AND POWER OF ATTORNEY (ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

_X_ original.
__ design.
__ supplemental.

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

__ national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

__ divisional.
__ continuation.
__ continuation-in-part (C-I-P).

INVENTORSHIP IDENTIFICATION

WARNING: If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor *(if only one name is listed below)* or an original, first and joint inventor *(if plural names are listed below)* of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

Method and arrangement for using a selected signal processing scheme to carry information

SPECIFICATION IDENTIFICATION

the specification of which:

(complete (a), (b) or (c))

(a) X is attached hereto.
(b) __ was filed on ____________, as Serial No __________________
or __ Express Mail No., as Serial No. not yet known __________________
and was amended on_________________*(if applicable)*.

NOTE: Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.

(c) __ was described and claimed in PCT International Application No.___________,
filed on _____________ and as amended under PCT Article 19 on
______________ *(if any)*.

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56,

(also check the following items, if desired)

X and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

__ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119(a)-(d))

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) __ no such applications have been filed.

(e) X such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119(a)-(d)

COUNTRY(OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 37 USC 119
FINLAND	991414	21 June 1999	X YES NO__
			__YES NO__
			__YES NO__
			__YES NO__
			__YES NO__

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S) (34 U.S.C. § 119(e))

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER	FILING DATE
______/________________________	____________
______/________________________	____________
______/________________________	____________

CLAIM FOR BENEFIT OF EARLIER US/PCT APPLICATION(S) UNDER 35 U.S.C. 120

__ The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN PART (C-I-P) APPLICATION.

ALL FOREIGN APPLICATION(S), *IF ANY*, FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

____

____

____

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(list name and registration number)

Clarence A. Green	(24,622)
Harry F. Smith	(32,493)
Mark F. Harrington	(31,686)

(check the following item, if applicable)

__ Attached, as part of this declaration and power of attorney, is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

Clarence A. Green
Perman & Green
425 Post Road
Fairfield, Ct 06430

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

Clarence A. Green
203-259-1800

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other documents.

Full name of sole or first inventor:

Given name: Guillaume
Middle initial or name:
Family (or last name): SEBIRE

Inventor's signature:
Date: May 29th, 2000
Country of Citizenship: France
Residence: ~~Luotsikatu 16 A 6, FIN-00160 HELSINKI~~, Finland
Post Office Address: ~~Luotsikatu 16 A 6, FIN-00160 HELSINKI~~, Finland
PURSIMIEHENKATU 16A6, FIN-00150 HELSINKI

GS. 29.5.2000

Full name of second joint inventor, if any:

Given name: Nikolai
Middle initial or name:
Family (or last name): NEFEDOV

Inventor's signature:
Date: 29 May 2000
Country of Citizenship: Russian Federation
Residence: Sunantie 19 I 26, FIN-02760 ESPOO, Finland
Post Office Address: Sunantie 19 I 26, FIN-02760 ESPOO, Finland

Full name of third joint inventor, if any:

Given name:
Middle initial or name:
Family (or last name):

Inventor's signature:
Date:
Country of Citizenship:
Residence:
Post Office Address:

Full name of fourth joint inventor, if any:

Given name:
Middle initial or name:
Family (or last name):

Inventor's signature:
Date:
Country of Citizenship:
Residence:
Post Office Address:

(check proper box(es) for any of the following added page(s)
that form a part of this declaration)

__ **Signature** for fifth and subsequent joint inventors. *Number of pages added* _____.

* * *

__ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____.

* * *

__ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added* _____.

* * *

__ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 CFR 1.47)

* * *

__ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

__ Number of pages added _____

* * *

__ Authorization of attorney(s) to accept and follow instructions from representative.

* * *

(if no further pages form a part of this Declaration,
then end this Declaration with this page and check the following item)
X This declaration ends with this page.